Agenda No

AGENDA MANAGEMENT SHEET

Name of Committee	**Communities Overview and Scrutiny Committee**
Date of Committee	**29 November 2010**
Report Title	**Rugby Western Relief Road**
Summary	Rugby Western Relief Road opened fully to traffic on 10th September. This report sets out the scheme history and outturn and invites members to comment.
For further information please contact	Roger Newham County Transport Planner Tel. 01926 412203 rogernewham@warwickshire.gov.uk
Would the recommended decision be contrary to the Budget and Policy Framework?	No
Background Papers	There are no background papers open to public inspection

CONSULTATION ALREADY UNDERTAKEN:- *Details to be specified*

Other Committees	☐	.....
Local Member(s) (With brief comments, if appropriate)	☐	.....
Other Elected Members	☐	
Cabinet Member (Reports to The Cabinet, to be cleared with appropriate Cabinet Member)	☒	Councillor A Cockburn
Chief Executive	☐	.....
Legal	☒	Ian Marriott
Finance	☒	Vicki Barnard and Chris Juckes

Other Chief Officers	[X]	Dave Clarke – Resources David Carter - Customers, Workforce and Governance.
District Councils	[ ]	.....
Health Authority	[ ]	.....
Police	[ ]	.....
Other Bodies/Individuals	[X]	Strategic Directors Leadership Team .....

FINAL DECISION **NO** *(If 'No' complete Suggested Next Steps)*

SUGGESTED NEXT STEPS :

Details to be specified

Further consideration by this Committee	[ ]	.....
To Council	[X]	Finance report – 14 December 2010.
To Cabinet	[ ]	
To an O & S Committee	[ ]	.....
To an Area Committee	[ ]	.....
Further Consultation	[ ]	.....

Agenda No

Communities Overview and Scrutiny Committee – 29 November 2010

Rugby Western Relief Road

Report of the Strategic Director for Environment and Economy

Recommendation

That the committee considers the content of this report and if appropriate makes recommendations to Council.

1. Background

1.1 Completion of the Rugby Western Relief Road (RWRR) has been a long held ambition of the County Council. The road is important to cater for traffic growth arising from recent housing and employment developments and to facilitate the future growth of Rugby. It was the culmination of many years perseverance when the road finally opened fully to traffic on 10 September 2010. Construction of the road is a very significant engineering achievement by the County Council. A summary of the development history of the road is contained in **Appendix A**.

1.2 Early indications from traffic counts in October are that the road has brought immediate traffic relief to the town. When compared to traffic flows before relief road construction began, traffic has reduced by up to 28% on main routes around the town centre. Positive feedback about the benefits of the road have been received from the public.

1.3 Despite the significant increase in cost since the contract for construction was let in 2007, the scheme still delivers very good value for money when assessed using the Government's major scheme appraisal methodology which compares scheme cost against scheme benefits. At the current predicted outturn cost the scheme cost-benefit ratio is 4.5 i.e. for every pound invested there is £4.50 worth of benefits.

1.4 However, the costs of this important project have increased considerably from an estimated £36.57m at the time the contact was awarded in July 2007 to an estimated final outturn cost of approximately £60M. The reasons for this need to be fully understood and explained. In particular the increase in the costs of the construction contract from an estimated £24.16m in 2007 to more than £39M has to be understood.

1.5 As a result of concern over rising costs which became apparent in summer 2008, a bid for additional funds was made to DfT and the Strategic Director for Environment and Economy sought and obtained reviews and input from both the Council's Internal Audit Team and the Resources Directorate starting in the Autumn of 2008. Following a considerable amount of work to review and predict expenditure on the project a confidential report went to Cabinet in October 2009. At that Cabinet meeting it was agreed that a Board of Members and Strategic Directors be established to oversee a review of the scheme and establish reasons for the increased costs. This Board has met eight times.

1.6 Cabinet asked the Board to consider the following questions:-

(i) Was the procurement process robust enough?
(ii) Was this the right contract for the scheme?
(iii) Could any of the increased costs have been foreseen?
(iv) Are the increased costs justified?
(v) Has the project management been robust enough?
(vi) Are there any wider lessons for the Council?

1.7 In October 2009, on the recommendation of the WCC Resources Directorate, Contractauditline (CAL), a specialist audit and contract consultant, was brought in to assist with the review. The consultant focussed on the questions described above. His report identified a number of issues and areas for improvement/action which form part of the lessons to be learnt by the Council.

2. The Procurement Process

2.1 The procurement process began in 2003, although work on the project itself was initiated a few years before this (as set out in **Appendix A**). Following advice from ARUP and Warwick Business School it was decided to adopt a target cost contract with early contractor involvement (ECI). The aim was to develop a partnering approach and innovative and cost saving solutions at design and development stage of the RWRR leading to a target cost, with the aim of these benefits being realised in the construction stage. Following a competitive tender process the contract for 'professional services' (ECI) was awarded to Mowlem in 2003. The contract contained an option (and expectation) to award Mowlem the construction contract, without the need for a further competitive tendering process, if the Council chose to do so and subject to agreement of an acceptable price.

2.2 This approach to the procurement was considered to be industry best practice at the time. As is the nature of major construction projects, various time consuming stages, including public inquiries and referrals to the Secretary of State, then took place as set out in **Appendix A**.

2.3 In 2006, Carillion acquired Mowlem and the Council continued with them under the professional services contract. Throughout this period the estimated cost had been increasing, largely due to significant nationwide construction inflation and further development of the scheme. This was reported to Members. In

2007, following agreement on prices, the construction contract was awarded to Carillion without further competitive tendering (see 2.1 above).

2.4 It is the Strategic Director's view that following the construction contract award to Carillion, the nature of the relationship between the County Council and its contractor changed, although this is difficult to prove and the precise point in time when this happened is not clear. We originally procured a partnering style of contract with the aim of it providing added value to both parties and savings on costs. At some stage the relationship appears to have changed to a more traditional, adversarial, style of contract.

2.5 There is a case for saying that when Mowlem were taken over by Carillion, the Council should have reverted to a full tender process for the contractor to construct the RWRR, rather than continue with Carillion. The reason for not doing this appears to have been the pressure to get the construction work started as soon as possible and the fact that acceptable prices were agreed with Carillion. The Strategic Director understands that the pressure arose from a number of factors, primarily the time limits on the availability of external developer funding but also Members wanting quicker progress and loss of some ECI benefits if tendered. There was no identified risk at the time in continuing with Carillion due to the fact that key staff employed by Mowlem (e.g., the Director, Regional Director and Contract Manager) remained on the project under Carillion until the contract was awarded. An illustration of the pressure at that time is that Council approved a notice of motion in December 2006, expressing great concern at delays caused by the Secretary of State which had led to lack of progress on the Rugby Western Relief Road.

2.6 The Strategic Director suggests that if a similar takeover situation occurred in the future a detailed review should automatically take place before awarding the contract to ensure that none of the assumptions on which the choice of contractor was based have changed.

3. Was this the Right Contract?

3.1 The decision to utilise a target price contract was taken based on expert advice and followed industry practice at the time. The choice was made on the basis that the Council and contractor would both strive to achieve savings against the target and share any financial 'pain' or 'gain'. The form of contract was chosen with the clear expectation that there would be some 'gain' on the contract. However, the ongoing relationship of the parties to such a contract is key and it is a complex process.

3.2 This opportunity was lost over time as the contract moved to a more traditional (adversarial) style of contract. This has created significant problems in administering the contract, compounded by the need to deal with an extraordinary number of compensation events.

3.3 The experience of building a large and complicated project under a target price form of contract has demonstrated how difficult it is, without a real spirit of partnership working, to administer such a contract in a way that maintains the incentives to keep costs down (see paragraph 5.6).

3.4 Our own experience with the RWRR has been repeated on other contracts. In recent weeks there has been considerable debate nationally about this form of contract. Cambridgeshire built a guided busway using a target price contract. It was reported in the New Civil Engineer magazine (NCE) on 7 September 2010 that the construction cost for this project has increased to £145M from an initial target cost of £87M. As a result Cambridgeshire has called for a Government funded public review of the NEC forms of contract. A further article in NCE on 21 October reports criticism of the NEC form of contract saying that it requires too much project management and generates too much paperwork.

3.5 If we were awarding this contract today, it is the view of the Strategic Director that a target cost contract in this form is unlikely to be recommended.

4. Could the Increased Costs Have Been Foreseen?

4.1 On major construction contracts there are always risks that costs will increase and they often do.

4.2 Unforeseen problems (e.g. unrecorded utilities, ground 'soft spots') are always a risk despite best efforts to identify them in advance. Costly delays can also be caused by events beyond the client's or the contractor's control (e.g. gaining access to land). There is no doubt that a significant amount of the increased costs on the RWRR are as a result of such factors, e.g. access to Network Rail's land, led to huge delays. The completion date of September 2010 is 13 months later than the date envisaged at the start of the construction in August 2007 and this delay is responsible for a substantial part of the cost increase.

4.3 A problem illustrated by this contract is that bodies like Network Rail and Public Utilities can completely divest themselves of risks arising from their actions or omissions and therefore have an unqualified influence over works where their land or equipment is involved. This is a national rather than local problem. At a suitable point this may be worth taking up with Government, perhaps with the help of our local MPs.

4.4 Good practice is to identify, plan and cost for risks, although this is not an exact science. The CAL report is critical of the risk management process indicating it lacked sufficient structure and proactive development, i.e. there should have been a more dynamic process taking place and a more complete risk register.

4.5 However, staff in Environment and Economy involved with the project argue that there was a strong focus on risk management prior to work starting on site and that the response to risks throughout the contract was both proactive and reactive. For example, work was substantially reprogrammed to minimise the impact of delays caused by Network Rail in 2008.

4.6 It is the view of the Strategic Director that steps were taken to identify and manage risks throughout the project. However, the risk register itself could have been more dynamically managed and maintained to ensure all risks being identified were logged, fully costed and dealt with. A more assiduous approach

to maintaining the risk register would have helped provide evidence of the risk management that took place.

4.7 The presence of a structured approach to risk management is therefore an important future test for all projects across the council. The approach to risk management advocated by CAL would seem to be at a higher level than traditionally operated generally within the county council and it raises a question about whether the council (not just Environment and Economy) currently has sufficient levels of skill and knowledge for the kind of dynamic risk assessment (including the costing of risks) envisaged.

4.8 At the pre contract stage the project manager went through a structured process to arrive at an appropriate level of contingency which reflected the challenges and complexity known at the time. With hindsight, it is clear that a much higher amount should have been built into the initial (2007) budget for the project. CAL suggest an additional £2m-£3m should have been added but even this is small compared to the actual increase in cost. This clearly needs to be addressed more carefully for future major projects.

5. Are the Increased Costs Justified?

5.1 The contract is cost reimbursable with a target cost. This means that the contractor is entitled to be reimbursed for all of the costs he incurs less any costs that can be disallowed under the terms of the contract. The contract operates as an open book contract so we can check applications for payment are correct. If the final cost is above or below the target cost the payment to the contractor is adjusted for gain or pain in accordance with the terms of the contract.

5.2 As the contract progresses the contractor applies for reimbursement of costs incurred. Payments are therefore retrospective to cover costs already incurred. All applications for payment are scrutinised in detail by the ARUP commercial team on site to ensure they are justified.

5.3 Following a recommendation in the report by CAL an external specialist cost consultant (Stradia) was appointed in January 2010. The work by Stradia has not revealed any evidence that the Council has paid unjustifiable costs. Stradia has assisted in identifying the full range of disallowed costs but the total for disallowed costs is still being finalised.

5.4 In a target cost contract the initial target cost for the contract is adjusted through compensation events as the contract progresses. The direct cost of the work associated with compensation events is paid as a reimbursable cost. The sole purpose of the target cost is to reflect the changed scope of the contract so that an appropriate revised target cost is used to determine the level of pain or gain.

5.5 There has been a very high number of compensation events (over 1400) which is indicative of the scale of unforeseen events, the changing relationship with the contractor and changes to the scheme that have occurred. Back in 2008, when it became clear that the volume of compensation events and costs were potentially escalating, quantity surveying resources were increased.

5.6 The intention of a target cost contract is that the contractor is incentivised to keep costs down since he is rewarded for keeping the cost below the target. Due to the sheer number of compensation events it was not possible to agree valuations of the compensation events quickly enough to maintain a current target cost. This has meant that an up to date target cost has not been available to incentivise the contractor.

5.7 Intense negotiations are currently ongoing to try to reach agreement with Carillion on the target cost and total payment for the contract. Stradia are assisting with those negotiations.

5.8 A detailed breakdown and commentary on the predicted scheme out turn costs and a comparison with the estimated costs at the time the construction contract was let in 2007 is given in **Appendix B**.

6. Has the Project Management Been Robust Enough?

6.1 There is, understandably, much concern about the increase in costs and this has led to questions about the quality of project management on the scheme.

6.2 CAL are critical about some aspects of the project management process but, whilst there are arguments over whether or not the process was robust enough, it would be wrong to simply focus on this.

6.3 There is a question as to whether sufficient project management resources were provided during the early stages of the construction works to deal with design issues and compensation events. In 2008, as it became clear that costs were escalating and under the pressure of increasing numbers of compensation events, more resources were put on the project. The need to bring in additional resources was partly due to indications that the contract was becoming more adversarial and that compensation events were not being administered in accordance with the principles of the contract.

6.4 A Strategic Management Board (SMB), including the contractor's Regional Director and Senior Contract Manager, and WCC's Project Manager and the Head of Transport and Highways (Chair of Board) exists. Initially the Board met three times between July and December 2003 but became dormant when the scheme was put on hold following an adverse decision from the first public inquiry. The Board was reconvened in November 2007 following the start of construction in August. During the period that the SMB was dormant, meetings of the internal Warwickshire Engineering Board were taking place regularly which was maintaining governance.

6.5 CAL feel that when the Board did reconvene there were fewer formal reports presented than might have been expected for a project of this size. CAL have also expressed the view that the minutes lacked sufficient evidence to confirm that the quantum of the increasing costs were being reported until July 2008 or that the actions being taken to address them were being recorded. However, CAL also acknowledges that the extent of delays to the project were being reported with references to attempts to mitigate costs.

6.6 In 2008, focus on the escalating costs increased significantly and project management was enhanced. Support from Internal Audit was sought and the Head of Projects from the Resources Directorate provided an independent view and assurance on budget forecasts.

6.7 CAL raises concern about the relative lack of formal structure in parts of the project management. In contrast, the view of CAL is that the work done by the Project Manager throughout this period was very good. It is not possible to say whether a more formal approach to parts of the project management would have made a significant difference.

6.8 CAL raised concerns about the relative roles of the project manager and the Strategic Board. CAL's view is that the project was being driven more by the project manager than the Board and that it should have been the other way around. However, it is now normal practice in EED and the method envisaged by PRINCE2, that the project manager takes the lead in delivering a project with Governance and support from a Board. This has been a successful approach for projects such as Coleshill Parkway. It is the project manager not the Board who is in close daily contact with the project and therefore must control it. The role of the Board is to ensure the project manager has the necessary resources to deliver the project and to make decisions brought to it by the project manager. CAL have said that it is impossible, even with the benefit of hindsight, to link conclusively any of the problems that have been experienced on this project to what they consider to be weaknesses in control exercised by the SMB.

6.9 With hindsight, it is the view of the Strategic Director that it would have been beneficial to establish a Member/officer Board in 2007 to oversee the project and be able to challenge progress reports. This is becoming more common with major projects within WCC (e.g. the new Highway Maintenance Contract/Procurement and the transfer of concessionary fares). Such project boards would be appropriate for large capital projects and programmes in future.

7. The Design Process

7.1 In addition to the specific questions set by Cabinet there are other important matters to emerge from the review of the RWRR project.

7.2 The design of some elements of the project have had to be changed due to design deficiencies that became apparent during construction. In some cases the design changes had to be made after partial construction of the original design. For example, two of the roundabouts on the route required a major change in design and one other required more minor redesign. It is vital that projects have clear mechanisms for ensuring any mistakes are systematically analysed to ensure that they are dealt with in the quickest and most effective way and that lessons are learnt. These design deficiencies have been responsible for a relatively modest proportion of the scheme cost increase.

7.3 The design was carried out by a combination of Environment and Economy's internal design team, its partner design consultant ARUP and the construction

contractor under ECI. The Directorate has quite a large 'in house' design team, which has been supplemented with staff from ARUP who have worked alongside them and, where required, other external consultants with specialist skills. ARUP have also assisted through, for example, providing quantity surveyors to value works done by Carillion.

7.4 The Strategic Director is of the view that the combination of quite a large 'in house' design team working with an external firm of consultant designers on a major project carries the risk for the council that its client role becomes compromised by its role in the design of the project itself. There is an argument that retaining a strong 'in house' design team helps ensure a strong and sustainable 'intelligent client'. However, it is the view of the Strategic Director that on such a major contract, there is a strong case that the whole of the design work should have been contracted out.

7.5 An investigation into the design errors is currently underway to establish what action, if any, should be taken in relation to the design shortcomings.

8. Conclusions

8.1 Completion of the RWRR has brought significant traffic benefits to Rugby and it will facilitate future planned growth in the town. Even at the higher out turn cost it still delivers very good value for money when assessed using the Government's scheme appraisal methodology which compares scheme cost against benefits.

8.2 The RWRR is a large and complex project. All major road construction contracts carry risks that unforeseen costs will be incurred and much was done on this contract to manage risks and to mitigate the cost of problems that arose. Some of the cost increases can be attributed to causes that could and should have been avoided and mistakes were made with some elements of design. However, the majority of the cost increase relates to matters that could not have been foreseen and were outside the control of WCC and Carillion.

8.3 There is no evidence to suggest payments made to Carillion are not contractually justified. To ensure that the Council's commercial interests are protected a specialist consultant (Stradia) has been brought in to advise on and assist with commercial negotiations with Carillion. With the help of Stradia the Commercial negotiations are progressing towards resolution of the final account.

8.4 Competent project and risk management was deployed on this contract without which costs and delays could have been significantly worse. However, there was some lack of structure and formality to some aspects of the process (e.g. risk management). In future the structure of project management and risk management needs to be more robust in projects of this nature and scale and there are important lessons to be learnt from this. Establishment of a Member/officer board to provide strategic governance should be considered for future major projects.

8.5 The anticipated benefits of an ECI and target price contract have not been realised on this project. Careful consideration is required to determine the best

form of contract for major projects in the future. In order to assist with this evaluation Stradia have been asked to advise on lessons that should be learnt from this contract and they will in due course provide a detailed report on this. Outline advice from Stradia for future contracts is :

- Pay careful attention to pain/gain incentive mechanisms in contracts of this nature to ensure they are suitable for the individual contract.
- Adopt improved risk mitigation techniques
- Use of enhanced contract provisions relating to open book cost management and adopt improved methods for defining costs payable under the contract
- Implement greater integration of contractor and client commercial teams
- Try to reduce the amount of change during construction and pay close attention to risk created by design change.
- Adopt more proactive cost management techniques
- In target price contracts ensure a current target price is always present during the contract to maintain incentive for the contractor

8.6 The procurement process was robust and followed good practice. However, pressure to let the contract meant that some aspects of design were not complete at the time the contract was awarded. This led to some increase in cost and also meant that the target price was too low at the time the contract was let due to omission of costs that would have been identified if the design had been complete. The risks inherent in letting a construction contract without complete design and information are well known. However, the pressure to begin this contract was intense (see paragraph 2.5).

8.7 With hindsight, the level of contingency was much too low. Optimistic assumptions were made that ECI would lead to a more buildable scheme design with fewer difficulties and it had been anticipated that a financial gain would be made compared to the target cost, which would be shared with the contractor. These optimistic assumptions led to a lower than normal contingency. For future contracts it is vital that contingency sums built into contract estimates reflect the risks in those contracts. In this context Contractauditline suggest that a robust contingency sum for this contract would have been £2-3M. It is worth noting that the estimated cost of land and land compensation alone for this scheme has increased by £2M. The Strategic Director's view is that a more robust discussion and specific value needs to be put on risk in advance of contracts being let.

8.8 A substantial proportion of the cost increases in this contract were due to actions or omissions by NR and Public Utilities. The Council has no redress regarding these costs. This may be a matter that should be taken up at national level.

8.9 The mixture of in house staff and external staff who worked on the project all reported to a WCC project manager. This created a blurring of responsibilities and accountabilities and should be avoided in the future. To ensure clarity of responsibility for complex and large scale projects consideration should be given to the use only of external design consultants and/or design and build contracts in the future.

PAUL GALLAND

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18 November 2010

Appendix A of Agenda No

Communities Overview and Scrutiny Committee – 29 November 2010

Rugby Western Relief Road

Rugby Western Relief Road – Development History

Date	Activity, Event or Decision	Estimate
1997	Rugby Local Plan adopted with the Western Relief Road as a key infrastructure requirement to support planned major developments at Cawston, Malpass Farm, Swift Valley and Coton.	
1997 to 2000	Negotiations with developers to secure S106 funding. Agreements gave 10 years for the money to be spent before refunds had to be made to developers. The amount of developer funding secured was insufficient to fund the full length of the scheme. WCC decided to implement a shortened first phase which utilised the primary distributor road of the Cawston housing estate.	
October 1999	Planning permission granted for the shorter scheme with alignment on the disused railway and utilising the primary distributor road of the Cawston housing estate at the southern end.	
August 2000	Rugby Cement announced its intention to reopen the disused railway line. Cabinet had previously agreed in March 2000 to support reopening if Rugby Cement decided to proceed.	
Autumn 2000	A bid was made to DfT for funds to extend the road to Potsford Dam and to move alignment off the disused railway. Provisional approval was granted by DfT in December 2000 with a provisional major scheme funding allocation of £8.06M.	£20.2M
October 2001	Cabinet approved a revised scheme with an alignment off the disused railway and extending to Potsford Dam. Approval given to commence statutory procedures for planning and Orders.	
April 2002	Further revisions to the outline scheme design and revised estimate approved by Cabinet.	£20.6M
May 2002	Planning application for current scheme submitted	
July 2002	Rugby Cement abandon plans to reopen railway.	
Sept 2002	Cabinet approve continuation with scheme off the disused railway to preserve the opportunity for reopening and a revised estimate	£21.4M
Spring 2003	Planning permission granted for full length scheme. First public inquiry held.	
July 2003	Cabinet approved award of Early Contractor Involvement (ECI) contract to Mowlem	
January 2004	Cabinet approved revised estimate	£23.9M

Feb-June 2004	Secretary of State (SoS) announced in February 2004 that he was minded to approved the Orders only the northern section of the road. Reports to Area Committee (May) and Cabinet (June) led to a decision to reject the SoS decision and to seek a second public inquiry.	
April 2005	Cabinet approved revised estimate	£26.8M
Spring 2005	Second public inquiry held	
Dec 2005	SoS approved the Orders for the full length scheme subject to a range of amendments	
Feb 2006	Cabinet approved : 1. scheme amendments to meet SoS requirements. 2. Continued employment of the ECI contractor	
May 2006	Cabinet approved revised estimate	£30.57M
May 2006	Mowlem taken over by Carillion	
July 2006	Revised planning permission granted incorporating the amendments required by the SoS	
Nov 2006	SoS gave final approval to the scheme Orders	
Dec 2006	Notice of Motion to Full Council expressing concern of lack of progress with the scheme	
Feb 2007	Cabinet approves 1. Revised estimate 2. Letting of a contract for construction subject to full approval of the scheme (funding) by DfT. 3. Letting of an advanced contract for site clearance. This work had to be carried out before the bird nesting season to avoid undue delay to the start of the scheme. It was necessary to let a low value advance contract due to the lack of final funding approval from DfT which prevented letting of the main contract.	£35.1M
Feb 2007	Planning permission granted incorporating further requirements of the SoS	
8 March 2007	DfT granted full approval and £17.083M funding	
29 March 2007	Cabinet approved revised estimate	£36.5M
June 2007	Cabinet approved award of main contract to Carillion	
August 2007	Work started on main construction contract	
January 2008	Cabinet approved earmarking of capital receipts for RWRR from sale of properties previously purchased for road improvements made redundant by the Western Relief Road	
Sept 2008	Cost increase reported to Cabinet. Network rail and Utilities were identified as the cause	£38.5M
January 2009	Cost increase and an 11 month delay reported to Cabinet. Additional costs and delays due to Network rail and Utilities were identified as the cause	£42.9M
January 2009	DfT granted an additional £4.179M to the scheme following a bid of £6.33M from WCC	
October 2009	Major report to Cabinet and Council. Council approved a revised estimate.	£55M

Appendix B of Agenda No

Communities Overview and Scrutiny Committee – 29 November 2010

Rugby Western Relief Road

Cost Increases - Details and Comment

1. Summary of Costs and Funding

1.1 Table 1 below contains a comparison of the following cost estimates :-

- April 2007 - The last approved estimate prior to award of the contract to Carillion.
- October 2009 - The estimate approved by Council on 20 October 2009 which was prepared with the help of Resources Directorate and involved a great deal of work over Spring and Summer 2009 to review the project and predict expenditure
- October 2010 - The latest estimate prepared following completion of construction. It is not possible to give the final cost of the Carillion contract since the final account for that contract is not yet agreed. It is, however, predicted that the final total payment to Carillion will exceed £39M.

Table 1 – Comparison of Cost Estimates			
Description	**April 2007 £000**	**Oct 2009 £000**	**Oct 2010 £000**
Works – Main contract (Carillion)	24,162	37,956	>39,000
Works – Advance site clearance (note 1)	0	0	163
Works - Post completion (note 2)	0	0	100
Land and land compensation	2,746	3,156	4,719
Utilities and Network rail	4,110	6,387	6,845
Fees	5,020	7,501	8,919
Contingency (see note 3)	535	0	0
Total	**36,573**	**55,000**	**>59,746**

Note 1 – The advanced site clearance was carried out by Carillion in early 2007 under a separate contract (see appendix A for more background).
Note 2 – This is work such as landscaping that will be carried out by other contractors now the main contract has finished. The work was originally included in the Carillion contract and the main estimate but has been removed from that contract to deliver better value.
Note 3 – Contingency was included as a separate allocation in the April 2007 estimate but was built into the works – main contract estimate in October 2009. There is no contingency built into the October 2010 estimate.

1.2 The scheme has £55M of approved funding at present. A report to Council is planned for 14 December to seek approval for additional funds for the project. Existing funding is detailed in Table 2.

Table 2 – Approved Funding	
Description	**Amount (£000)**
Government Major Scheme Funding	21,262
S106 Developer Funding	15,445
Capital Receipt from sale of properties in Bilton and Newbold Rd	2,000
LTP Integrated Transport funding	6,676
Prudential Borrowing	9,433
Revenue (used during early scheme development, before 2001-2)	184
Total	**55,000**

2. Cost Increase – Land and Land Compensation

2.1 The estimated cost of land acquisition and compensation for the effect of the scheme on the value of surrounding property (Part 1 – Land Compensation Act 1973) has increased by 72% from £2.746M to £4.719M. The bulk of this increase is due to recent advice from WCC advisors that their original estimate for Part 1 Land Compensation payments should be substantially increased.

2.2 This Part 1 Claim element of the scheme cost is the one that remains most uncertain. A Part 1 Claim for compensation can only be made 12 months after the road opens and may be made up to 6 years after opening.

2.3 The Part 1 Claims may be made due to physical factors as set out in the legislation e.g. noise. Very substantial mitigation works have been deployed along the sensitive lengths of the route so the level of claim should be minimised.

2.4 A noise report will be commissioned to ensure that the value of claims can be accurately assessed.

3. Cost Increase - Utilities and Network Rail

3.1 Public Utility diversion costs have increased by 78% from £3.468M to £6.169M.

3.2 As part of the scheme design detailed enquiries were made to all Public Utilities (PU) to determine how utilities would impact on the scheme and to determine the requirements for utility diversions. The presence of utilities can have great significance for the scheme design. For example the presence of major utilities adjacent to Sow Brook led to the decision during the early design phase to increase the span of the bridge to avoid the need to divert those utilities.

3.3 Legislation requires that the County Council must pay PUs to design and execute service diversions. WCC is reliant on the PUs for accurate information about the presence of services and the cost of diversions. PU estimates for works proved to be inaccurate which lead to an underestimate of costs in the April 2007 estimate. During construction difficulties with service diversions and inaccuracies in the PU records also led to increased costs in dealing with services. In addition to the direct costs paid to PUs these difficulties also caused

delay and disruption to the main works contract which increased the cost of that contract.

3.5 Network Rail costs have increased by 5.5% from £641,000 to £676,000. These costs relate to diversion of a 25KV power cable and to the cost of Network Rail staff required to supervise the site during track possessions.

4. Cost Increase – Works (Main Contract)

4.1 The final account for the cost of the main works contract with Carillion is not yet agreed. It is expected that the final agreed payment will exceed £39M. This represents an increase of more than 61% from an initial target cost of £24.162M. There are many reasons for this cost increase, the principal reasons are given below to illustrate how cost increases have arisen.

4.2 Network Rail – Network Rail (NR) caused a substantial proportion of the 13 month delay and disruption to the main works contract due to problems with their own works on the West Coast Main Line, works by NR for RWRR and also due to their very protracted and delayed approval processes for works on or adjacent to the railway. The cost of this delay and disruption exceeds £5M.

4.3 Public Utilities –The presence of uncharted utilities and inaccuracies in the PU record drawings led to delay, disruption and extra work in the main works contract. It would be a major exercise to interrogate all of the compensation events to determine the full extra cost relating to utilities. However, the cost exceeds £0.5M.

4.4 Ground Conditions and Earthworks – Site investigation carried out during the design phase identified only one area of poor ground. In reality a number of areas of poor ground were encountered and one area of contaminated ground had to be dealt with. Due to more unsuitable material arising from the works and some changed design requirements relating to flood compensation area and balancing ponds a great deal more material than expected had to be removed to tip off site. It is estimated that the cost of dealing with unforeseen ground conditions and earthworks changes was £1.3M.

4.5 Parkfield Road – Various engineering difficulties were encountered in constructing the RWRR along the length of Parkfield Road between the quarries adjacent to the Cemex works. A tunnel connecting the quarries and large retaining walls had to be constructed in this area which is very constrained by the quarries each side. The area contained a high concentration of utilities in a tight space.

Substantial additional temporary works were required to facilitate construction of the tunnel and retaining walls. Temporary works are primarily the responsibility of the contractor and it is disappointing that this aspect of construction did not benefit from Early Contractor Involvement (ECI). In addition the pressure to start construction (see paragraph 2.5 of the main report) meant that some elements of design for this part of the works were not complete at the time the contract was started. The final design which was completed during construction encountered complexities that led to costs that were higher than those assumed

in the initial target price. All of these difficulties were compounded by the presence of congested services which meant even slight variances in type and location of services created great difficulties. The total additional cost of these works was £550,000 plus delay and disruption costs.

4.6 Design Issues – A number of design errors became apparent during the construction phase. Two roundabouts required substantial changes to their design after they were substantially constructed and one roundabout was replaced with a T junction after it had been partially constructed. The cost of these design errors is estimated at just under £800,000.

4.7 Street Lighting and Traffic Signs – The urgency to begin construction is described in paragraph 2.5 of this report. When construction began in August 2007 the traffic signs and street lighting had not been designed. Provisional sums were therefore included in the contract target price to cover these items. Once design was done the cost of lighting and signs was just over £1M more than allowed for in the provisional sums.

4.8 A wide variety of other factors led to costs that were higher than was assumed in the initial target price. Examples of these with approximate costs are :

- The need to remove asbestos found in the old railway embankment, removal of asbestos cement pipes left by Severn Trent and other unexpected additions to site clearance (£250,000)
- Unforeseen additional landscaping costs and accommodation works such as hedges (£210,000)
- Severn Trent Water were unable to carry out diversion of a 600mm diameter water main in the planned way and this added £370,000 to the cost of constructing Sow Brook Bridge.
- A pumping station was required on Parkfield Road to pump highway drainage from the low spot under the railway bridge. Due to the pressure to begin work the design of the pumping station was not fully developed at the start of the contract and it had been assumed that a low voltage electricity supply would be used to power the pumping station. Completion of the design and the need for a high voltage cable to power the pumping station led to an increased cost of £148,000 compared to the amount allowed in the initial target price.
- The retaining wall adjacent to the Paynes Lane industrial estate had to be redesigned and increased in height due to the risk of damage to an adjacent industrial building that became apparent once construction began. The changes led to an increase in cost of £320,000.
- Weather - the severe winter of 2009-10 led to loss of production and delay which increased costs but it is not possible to quantify the cost.
- A wide range of other minor unforeseen engineering difficulties were encountered which individually were not high costs but the number of them when added together adds significantly to the total. Many of these problems could not have been foreseen but some were due to inadequate or incorrect information from a variety of sources.

4.9 Under the terms of the target price contract Carillion are paid a fee which is a percentage of the total works cost. The fee covers items such as head office

costs, insurance etc. The increased cost of the works has meant that the final fee will be at least £500,000 more than that in the initial target price.

5. Cost Increase – WCC Fees

5.1 This fee comprises costs for WCC staff, ARUP staff and a range of other consultancy costs such as Stradia, topographical survey, ground surveys etc. The estimated cost of these fees has increased by 78% from £5.02M to £8.919M.

5.2 The percentage increase in the cost of fees is broadly in line with overall scheme cost increase. The increase is due to a combination of:

- A construction period that increased by 63% which meant staff resources were required for a longer period.
- The scale of difficulties encountered on the project which led to a need for increased staff both to deal with engineering difficulties and to deal with the unforeseen scale of commercial management of the project.

6. Cost and Risk Management

6.1 Some of the cost increases described above can be attributed to causes that could and should have been avoided and mistakes were made with some elements of design. However, the majority of the cost increase relates to matters that could not have been foreseen and were outside the control of WCC. All major road construction contracts carry risks that unforeseen costs will be incurred. Much was done to manage risks and to mitigate the cost of problems that arose.

6.2 During the design stage a comprehensive risk evaluation exercise was undertaken jointly with the ECI Contractor prior to awarding the contract, as part of the value engineering process. Risk registers were developed for the design, construction and maintenance stages of the project and those risks that could not be mitigated were evaluated and costed. The intended benefit of ECI was that these risks and costs would be better managed by the contractor being involved at design stage.

6.3 Throughout the construction phase close attention was paid to risk management. Weekly risk reduction meetings were held with the Contractor to consider the Early Warning notices that were raised (by the Council or Contractor) which identify potential issues that might have an impact on the construction works. The intention was to adopt action plans or mitigation measures to ensure additional costs were minimised.

6.4 Fortnightly design reviews and programme planning meetings are held to ensure that all of the works information, method statements and risk assessments were in place to suit the construction programme, to minimise delay and disruption.

6.5 Throughout the construction contract site staff sought to drive down the actual costs of the works and to deliver the works at the earliest opportunity by re-engineering, re-programming and re-sequencing activities. Savings have been made without which the works costs would have been even higher. Cost reduction planning was adopted which identified ways to reduce costs.

6.6 The approach described above can be illustrated through two examples relating to NR and Public Utilities.

(a) Forward planning of the railway bridge works with NR started in 2004 to agree the basic geometry of the bridge to ensure accordance with rail standards and to ensure track possessions would be available to facilitate its construction. Regular meetings ensued thereafter up to award of the contract in 2007 and NR were fully aware of Carillion's programme of works for the rail bridge. Unfortunately, frequent changes to the West Coast Main Line upgrade works programme and NR's protracted technical approvals process caused major disruption to the rail bridge and delay to the whole contract. The impact of these problems was mitigated by reprogramming the construction work to make construction of the bridge less critical to the overall programme.

(b) Extensive enquiries with Utilities were undertaken during the preliminary design stage to establish the location of the Utility companies' services along the line of the proposed RWRR. This information, together with the record drawings supplied by each Utility company, should have given an accurate picture to decide which services needed to be diverted or protected to accommodate the RWRR. However, these utility record drawings proved to be inaccurate or incomplete and a number of unknown services (both live and disused) were encountered, particularly STW sewers and electric cables. These had to be identified and either removed or diverted/protected causing delay and additional cost to the RWRR works. Wherever possible works were reprogrammed and other strategies were adopted to reduce the impact of these problems.

6.7 It was anticipated that the combination of ECI and a target price contract (which gives incentive to the contractor to deliver lower cost) would achieve lower risk of cost increases so a low contingency of 2% of the tendered construction target cost was built into scheme estimates. In the event there have been an abnormal number of problems on the contract and the intended benefits of ECI and a target price contract have not been forthcoming.